UNBRIDLED LEARNING
THE VISION FOR KENTUCKY'S FUTURE

GRADE

7

KENTUCKY

K-PREP

Kentucky Performance Rating For Educational Progress

MATH SAMPLE ITEMS

Spring 2013

EVERY CHILD
PROFICIENT & PREPARED FOR SUCCESS
KENTUCKY DEPARTMENT OF EDUCATION

The following are the general guides that will be used to evaluate your responses to short-answer and extended-response questions in this test.

Kentucky Short-Answer Questions General Scoring Guide

Score Point 2	• You complete all components of the question and communicate ideas clearly. • You demonstrate an understanding of the concepts and/or processes. • You provide a correct answer using an accurate explanation as support.
Score Point 1	• You provide a partially correct answer to the question and/or address only a portion of the question. • You demonstrate a partial understanding of the concepts and/or processes.
Score Point 0	• Your answer is totally incorrect or irrelevant.
Blank	• You did not give any answer at all.

Kentucky Extended-Response Questions
General Scoring Guide

Score Point 4	• You complete all important components of the question and communicate ideas clearly. • You demonstrate in-depth understanding of the relevant concepts and/or processes. • Where appropriate, you choose more efficient and/or sophisticated processes. • Where appropriate, you offer insightful interpretations or extensions (generalizations, applications, analogies).
Score Point 3	• You complete most important components of the question and communicate clearly. • You demonstrate an understanding of major concepts even though you overlook or misunderstand some less-important ideas or details.
Score Point 2	• You complete some important components of the question and communicate those components clearly. • You demonstrate that there are gaps in your conceptual understanding.
Score Point 1	• You show minimal understanding of the question. • You address only a small portion of the question.
Score Point 0	• Your answer is totally incorrect or irrelevant.
Blank	• You did not give any answer at all.

KENTUCKY MATHEMATICS REFERENCE SHEET
Grades 7 and 8

FORMULAS FOR PLANE FIGURES

Parallelogram: $A = bh$

Trapezoid: $A = \frac{1}{2}(b_1 + b_2)h$

Triangle: $A = \frac{1}{2}bh$

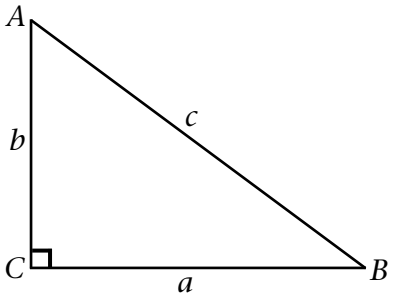
Circle: $C = 2\pi r$

$A = \pi r^2$

Right Triangle:

The Pythagorean Formula

$c^2 = a^2 + b^2$



FORMULAS FOR SOLID FIGURES

Right Prism: $V = Bh$ (B is the area of the base.)

Right Cylinder: $V = \pi r^2 h$

Regular Pyramid: $V = \frac{1}{3}Bh$

Cube: $V = e^3$

$SA = 6e^2$

Cone: $V = \frac{1}{3}\pi r^2 h$

Sphere: $V = \frac{4}{3}\pi r^3$

1

Sara studied a map that showed the routes people followed to explore and settle in Kentucky during the 1700s. The scale on the map showed that $\frac{1}{2}$ inch represents 25 miles. On the map, Sara measures the length of the Wilderness Road to be 4 inches. Based on Sara's measurement, how long was the Wilderness Road, in miles?

A 50
B 100
C 150
D 200

2

When the expression $\frac{2(3 - 2x)}{-4}$ is simplified, how does it compare to x?

A It is $\frac{3}{2}$ more than x.

B It is $\frac{3}{2}$ less than x.

C It is $\frac{3}{2}$ more than twice x.

D It is $\frac{3}{2}$ less than one-half of x.

3

A fraction $\frac{n}{d}$ is created by randomly selecting the value for n from the set $\{-2, 0, 2\}$ and randomly selecting the value for d from the set $\{0, 2, 4\}$. How many different fractions can be created that are rational numbers?

A 3
B 4
C 6
D 9

4

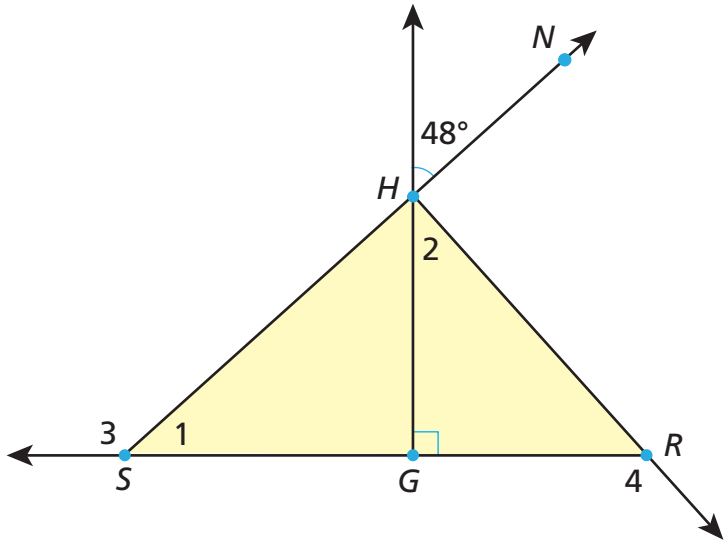
Chris won at most 300 tickets at an arcade game. He spent 128 tickets on a ball and the rest on gum. Each piece of gum was 25 tickets. Which inequality can be used to determine the greatest number of pieces of gum Chris could have purchased?

A $128 + 25g \leq 300$
B $128 + 25g \geq 300$
C $128 - 25g \leq 300$
D $128 - 25g \geq 300$

5

Nathan knows the following information about the diagram shown.

- $\overleftrightarrow{GH}$ intersects $\overleftrightarrow{SN}$ at point H
- $\angle 1$ and $\angle 2$ are congruent
- $\angle 3$ and $\angle 4$ are two of the exterior angles of ΔSHR



Based on this information, what is the sum of the measures of $\angle 3$ and $\angle 4$?

A 276°
B 270°
C 264°
D 260°

6

Each number in the table below represents the number of employees at different stores in two shopping centers.

Number of Employees at Each Store

Shopping Center E	Shopping Center K
6	8
8	9
12	11
17	14
20	16
23	21
29	23
37	26

Part A Determine the interquartile range for numbers of employees at each shopping center. Show your work or explain your thinking.

Part B Which shopping center would you expect to have a greater variability in regard to numbers of employees? Show your work or explain your thinking.

RUBRIC	
Score Point 2	• You complete all components of the question and communicate ideas clearly. • You demonstrate an understanding of the concepts and/or processes. • You provide a correct answer using an accurate explanation as support.
Score Point 1	• You provide a partially correct answer to the question and/or address only a portion of the question. • You demonstrate a partial understanding of the concepts and/or processes.
Score Point 0	• Your answer is totally incorrect or irrelevant.
Blank	• You did not give any answer at all.
Note: No part can be incomplete or incorrect and receive full credit.	

Correct Answer

Part A IQR for Shopping Center E is 16; IQR for Shopping Center K is 12

The IQR for Shopping Center E is $26 - 10 = 16$. The IQR for Shopping Center K is $22 - 10 = 12$.

OR similar work or explanation

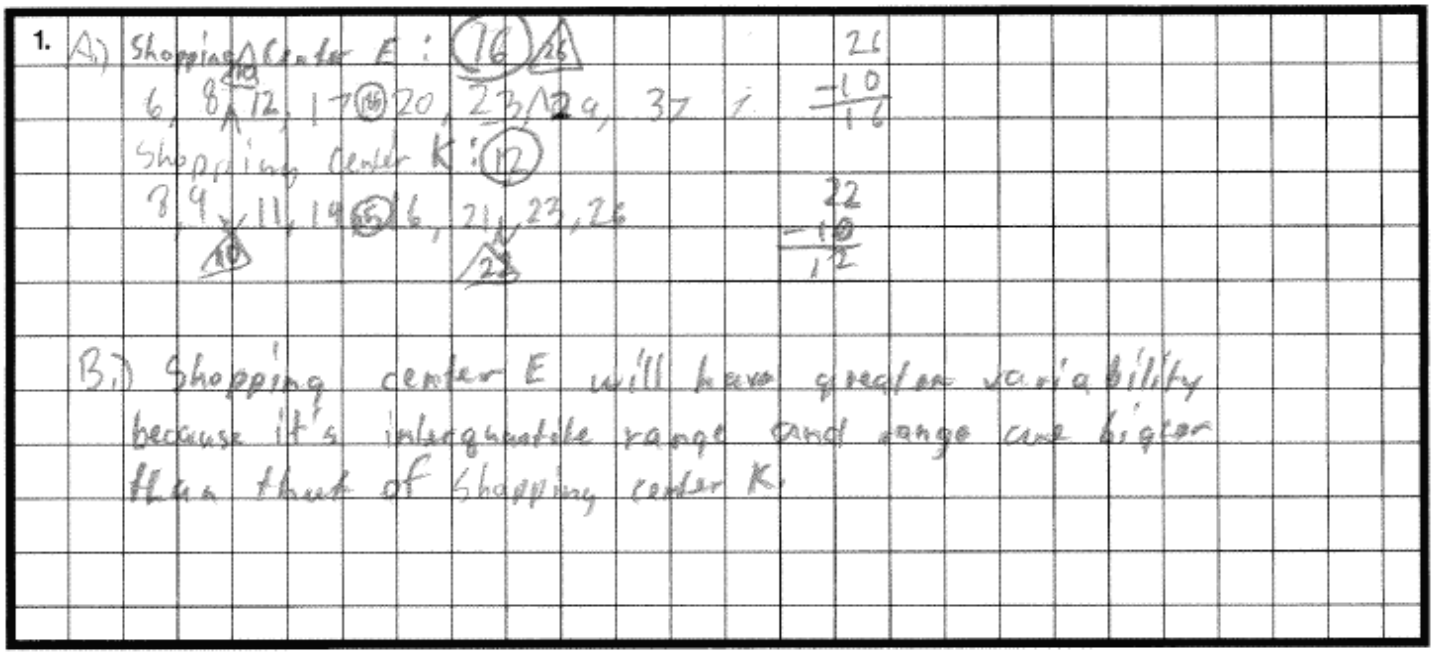
Part B Shopping Center E
Shopping Center E would have a greater variability in regard to numbers of employees since its numbers are more spread out and have a much greater range than the numbers in Shopping Center K.

OR similar explanation

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 2-POINT RESPONSE



ANNOTATION — 2-POINT RESPONSE

The student completes all components of the question and communicates ideas clearly.

Part A: The student provides two correct interquartile ranges or IQRs (16 and 12) and shows how the two IQRs were determined by finding the lower and upper quartiles for both centers and then subtracting the lower quartile from the upper quartile for each.

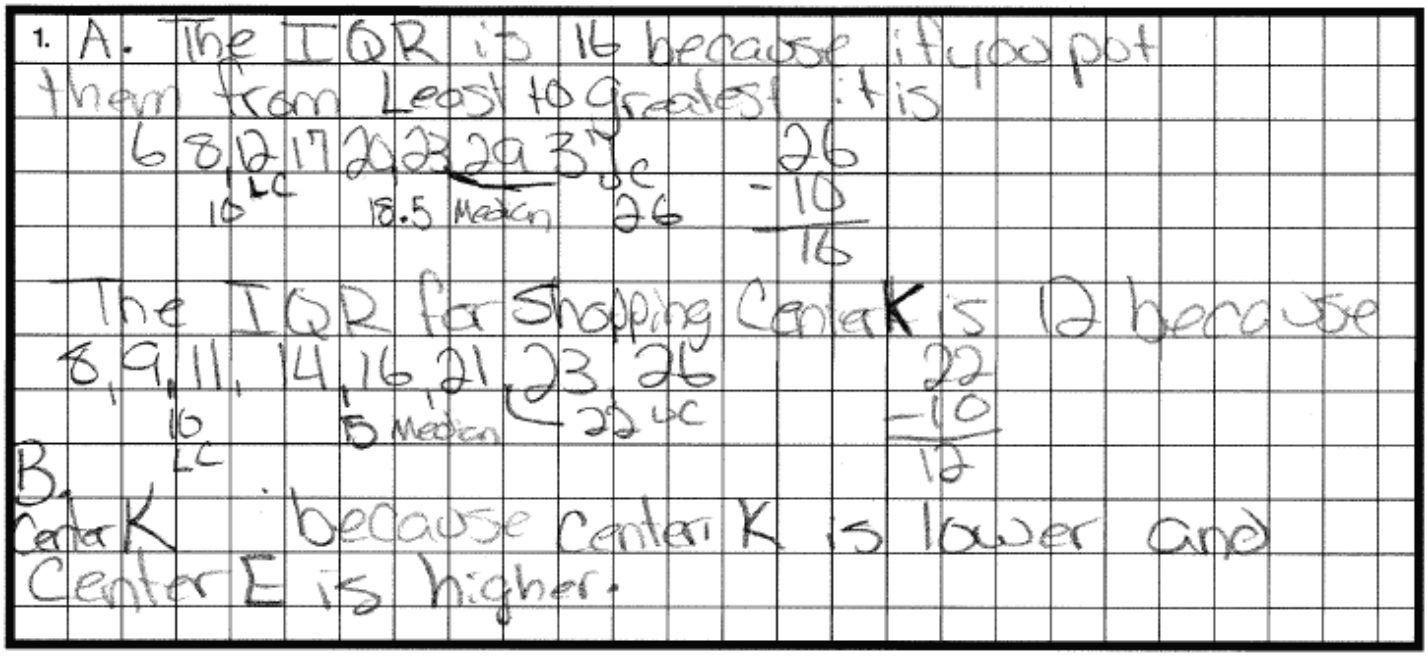
Part B: The student correctly answers the question *"Shopping center E"* and explains *"…because its interquartile range and range are bigger than that of shopping center K."*

Overall, the student earns 2 points.

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 1-POINT RESPONSE



ANNOTATION — 1-POINT RESPONSE

The student demonstrates a partial understanding of the concepts and processes.

Part A: The student provides two correct IQRs (16 and 12) and shows how the two IQRs were determined by finding the lower and upper quartiles for both centers and then subtracting the lower quartile from the upper quartile for each.

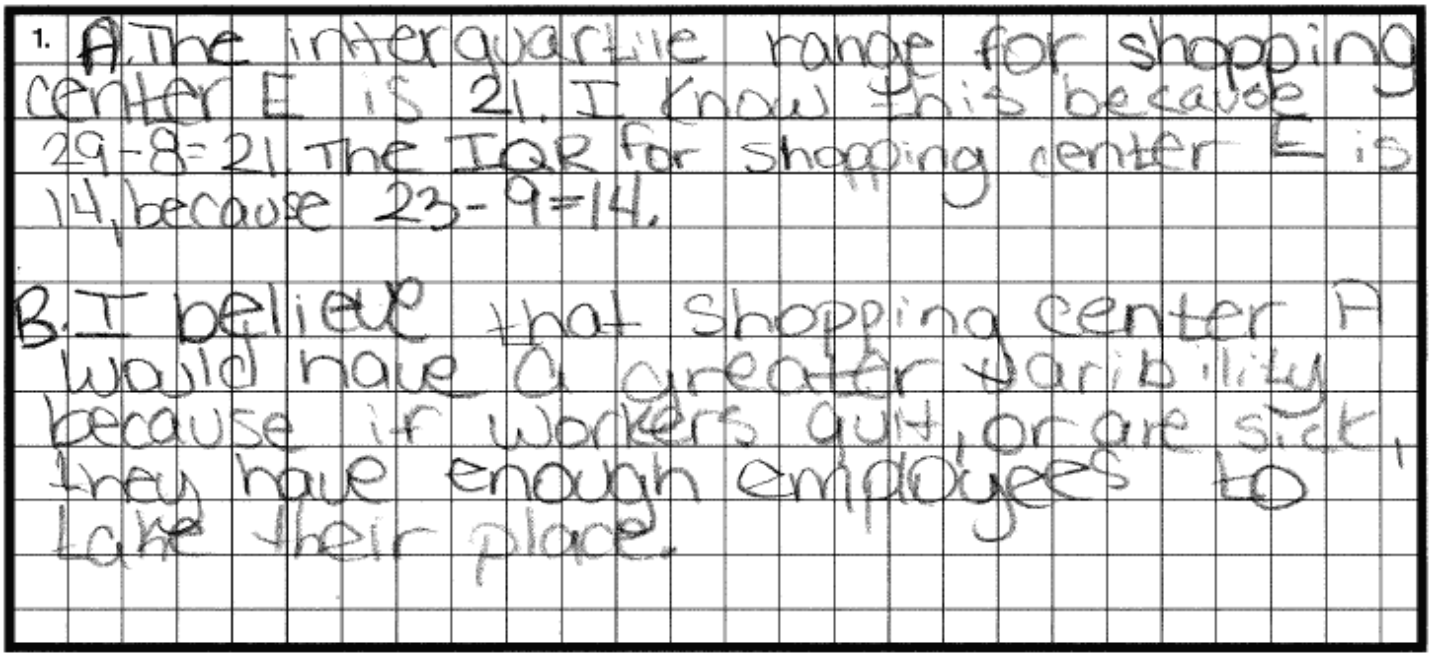
Part B: The student provides an incorrect answer of *"Center K"* and provides an incorrect explanation *"because Center K is lower and Center E is higher."*

Overall, the student earns 1 point.

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 0-POINT RESPONSE



ANNOTATION — 0-POINT RESPONSE

The student's answer is totally incorrect.

Part A: The student provides two incorrect IQRs and the explanation does not show an understanding of how to determine quartiles.

Part B: The student's answer is totally incorrect.

Overall, the student earns 0 points.

7

This month Frankie wants a watch that costs $28.75, not including tax. This price includes a 15% increase from the price of the same watch the previous month.

Part A What was the price of the watch the previous month? Show your work or explain your thinking.

Part B Next month, the price of the watch will increase by 20% from this month's price. What will be the price of the watch next month? Show your work or explain your thinking.

RUBRIC	
Score Point 2	• You complete all components of the question and communicate ideas clearly. • You demonstrate an understanding of the concepts and/or processes. • You provide a correct answer using an accurate explanation as support.
Score Point 1	• You provide a partially correct answer to the question and/or address only a portion of the question. • You demonstrate a partial understanding of the concepts and/or processes.
Score Point 0	• Your answer is totally incorrect or irrelevant.
Blank	• You did not give any answer at all.
Note: No part can be incomplete or incorrect and receive full credit.	

Correct Answer:

Part A $25.00

$x + 0.15x = 28.75$

$1.15x = 28.75$

$x = 25$

OR equivalent work or explanation

Part B $34.50

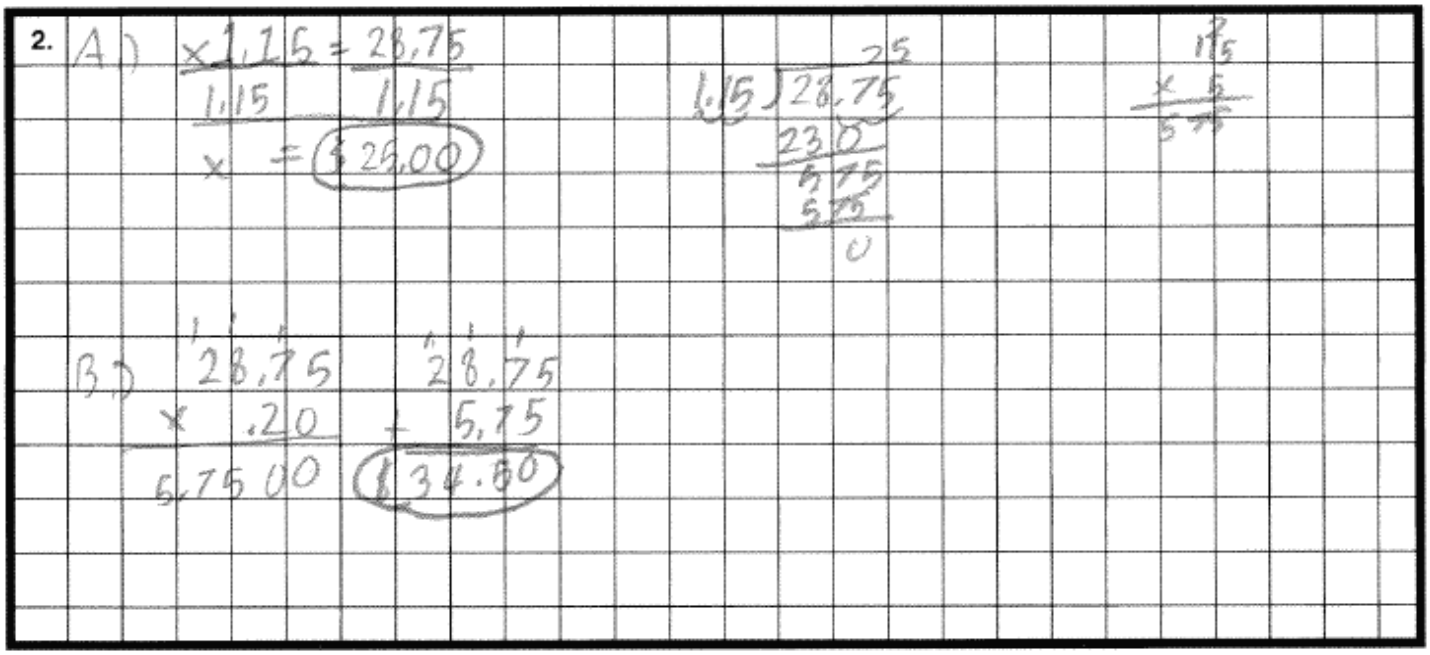
$28.75 + (0.2)(28.75) = 34.5$

OR equivalent work or explanation

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 2-POINT RESPONSE



ANNOTATION — 2-POINT RESPONSE

The student completes all components of the question and communicates ideas clearly.

Part A: The student provides a correct answer and uses a correct process. The student creates an equation *"x1.15 = 28.75"* and then divides each side by 1.15 to determine the answer *"x = $25.00"*.

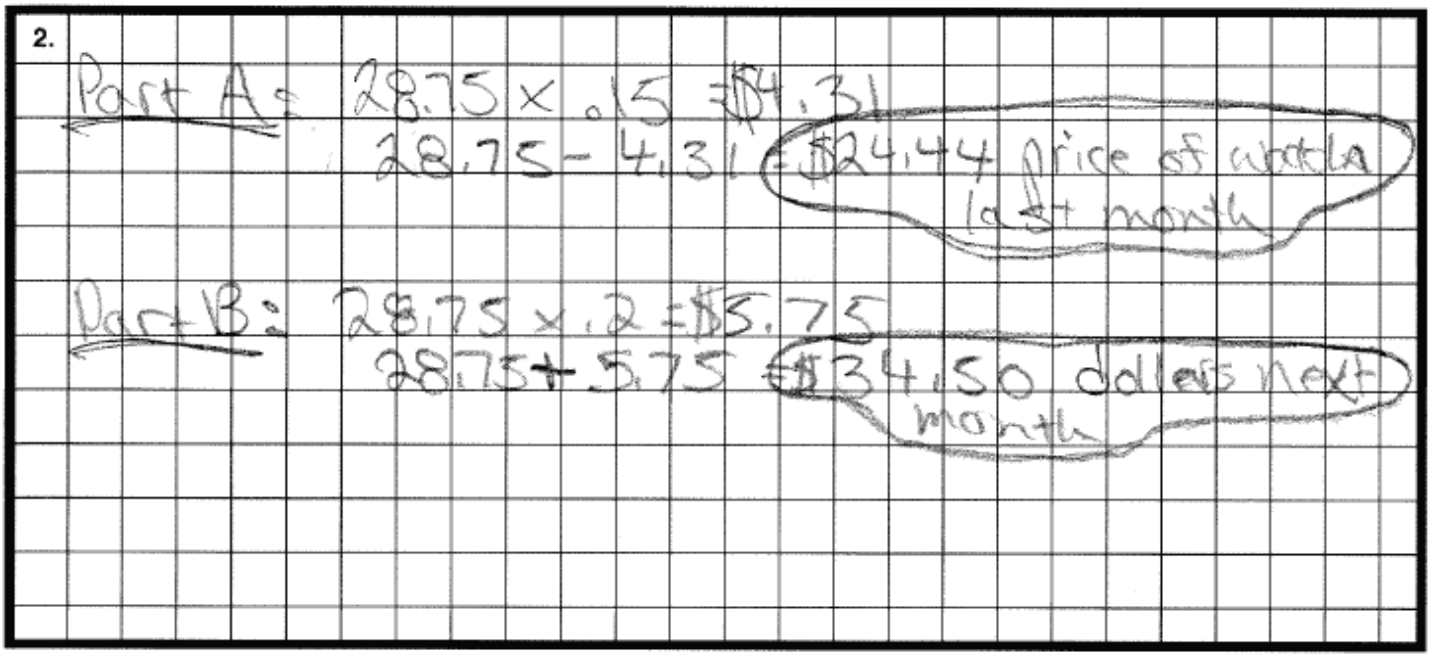
Part B: The student provides a correct answer and uses a correct process. The student multiplies 28.75 by .20 and then adds his result of 5.75 to 28.75 to determine the correct answer of *"$34.50"*.

Overall, the student earns 2 points.

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 1-POINT RESPONSE



ANNOTATION — 1-POINT RESPONSE

The student demonstrates a partial understanding of the concepts and processes.

Part A: The student provides an incorrect answer *"$24.44"* and uses an incorrect process.

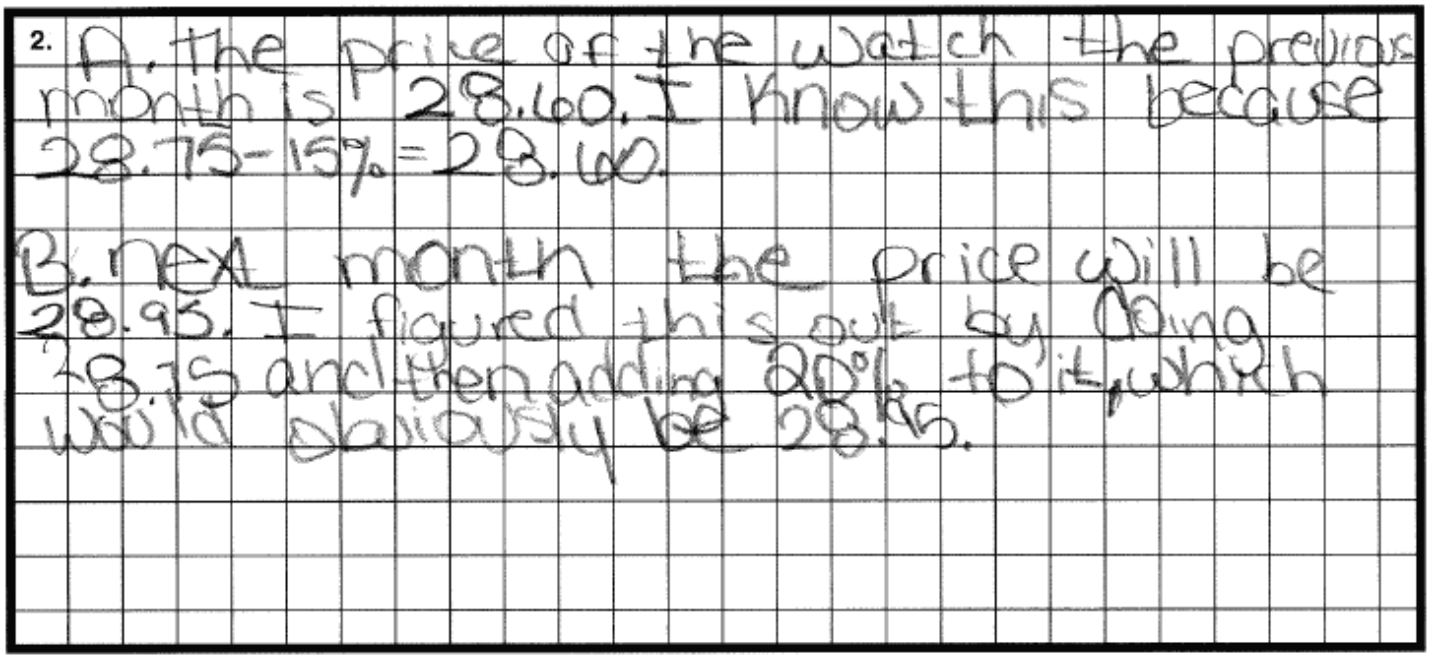
Part B: The student provides a correct answer of *"$34.50"* and the process used is correct, *"28.75 x .2 = $5.75, 28.75 + 5.75 = $34.50"*.

Overall, the student earns 1 point.

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 0-POINT RESPONSE



ANNOTATION — 0-POINT RESPONSE

The student's answer is totally incorrect.

Part A: The student provides an incorrect answer and an incorrect process, *"28.75 – 15% = 28.60"*.

Part B: The student provides an incorrect answer and an incorrect process, *"I figured this out by doing 28.75 and then adding 20% to it, which would obviously be 28.95."*

8

Part A On your answer document, draw a coordinate plane that uses only Quadrant 1.

- Label the *x*-axis with the numbers 0 through 10 using increments of 1.
- Name the *x*-axis "Time (minutes)."
- Label the *y*-axis with the numbers 0 through 100 using increments of 10.
- Name the *y*-axis "Volume (gallons)."

The coordinate plane you draw represents the amount of fuel in a tank as it is filled.

Part B Plot and label the point (8, 40) on your grid. Explain what the point represents.

Part C Plot and label a second point on your grid using a proportional relationship with the point (8, 40). Explain why the point you plotted represents a proportional relationship with the point (8, 40).

Part D Based on the proportional relationship you established in **part B** and **part C**, what is the volume, in gallons, after 12 minutes? Explain your answer.

RUBRIC	
Score Point 4	Student scores 4 points.
Score Point 3	Student scores 3 – 3.5 points.
Score Point 2	Student scores 2 – 2.5 points.
Score Point 1	Student scores 0.5 – 1.5 points. OR Student demonstrates minimal understanding of how the points on a graph of a proportional relationship relate to each other.
Score Point 0	Student's response is totally incorrect or irrelevant.
Blank	No student response.
Note: No part can be incomplete or incorrect and receive full credit.	

Score Points

Part A score 1 point correctly sketches a graph
OR
score 0.5 point correctly sketches part of the graph
OR
some correct procedure

Part B score 1 point correct answer with correct and complete work or explanation
OR
score 0.5 point correctly plotted point with incomplete or no explanation
OR
incorrectly plotted point or missing point with complete explanation

Part C score 1 point correct answer with correct and complete work or explanation
OR
score 0.5 point correctly plotted point with incomplete or no explanation
OR
incorrectly plotted point or missing point with complete explanation

Part D score 1 point correct answer with correct and complete work or explanation
OR
score 0.5 point correct answer with incomplete/ no work or explanation
OR
incorrect answer due to a calculation error (work must be shown)
OR
some correct procedure
OR
incomplete explanation only

Correct Answer:

Part A Student correctly draws and labels a coordinate plane.

Part B Student plots the point (8, 40). The point indicates that at 8 minutes, 40 gallons of fuel was in the tank.

Part C Student plots a second point, (x, y), that represents a proportional relationship with the point (8, 40). It represents a proportional relationship because $\frac{8}{40} = \frac{x}{y}$(the second point the student plotted).

OR similar explanation

Part D 60 gallons

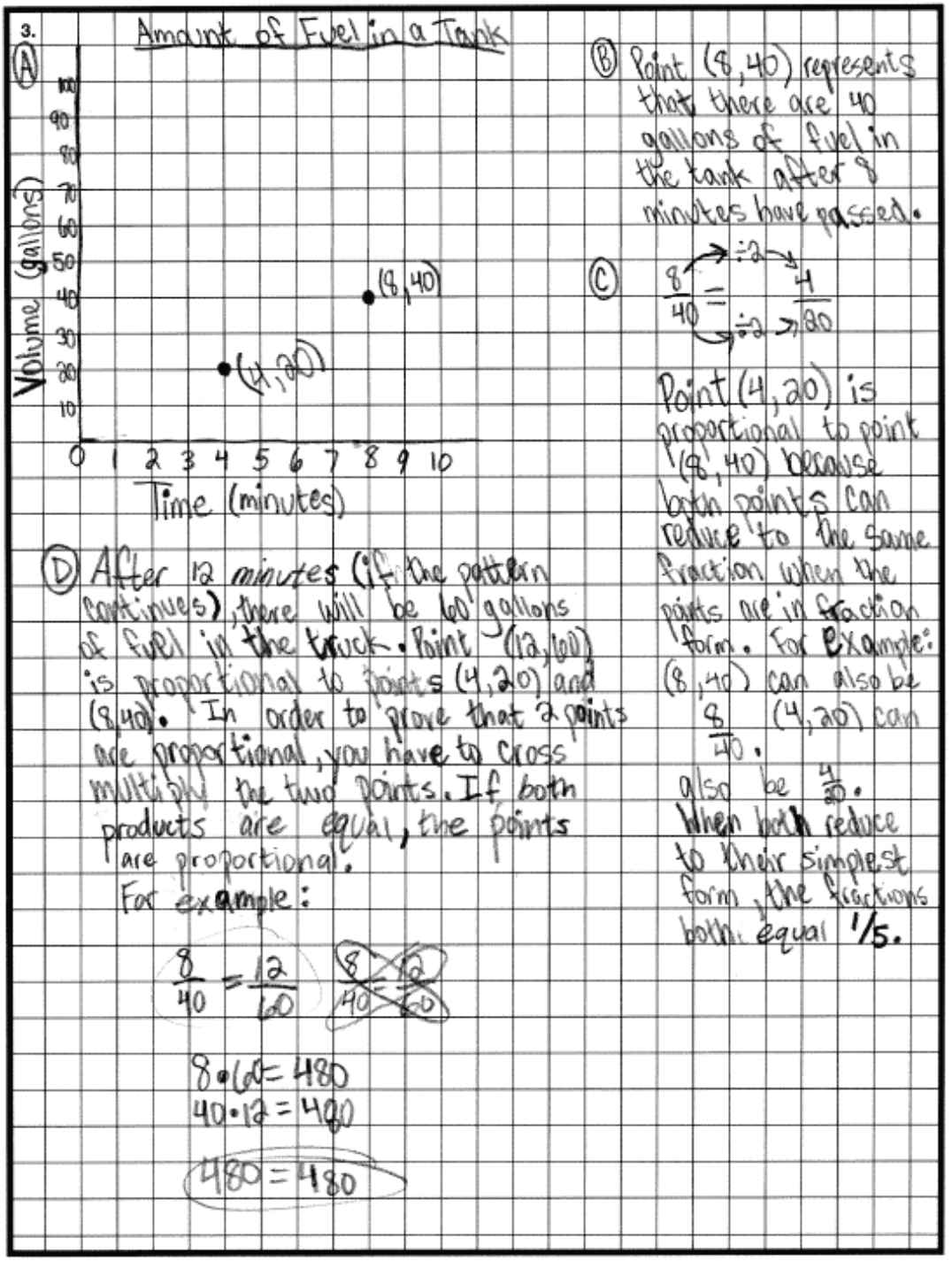
The volume in gallons is 60 after 12 minutes because $\frac{8}{40} = \frac{12}{y} = 8y = 480 = y = 60.$

OR a similar explanation

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 4-POINT RESPONSE **NOTES**



A 1.0

B 1.0

C 1.0

D 1.0

GRADE 7 — Mathematics

ANNOTATION - 4-POINT RESPONSE

A The student correctly sketches the graph with correct labeling and scaling of the x-axis and the y-axis. (1 point)

B The student plots and labels the point (8, 40) and correctly explains *"Point (8, 40) represents that there are 40 gallons of fuel in the tank after 8 minutes have passed."* (1 point)

C The student correctly plots and labels a second point (4, 20) using a proportional relationship with the point (8, 40). The student correctly explains *"Point (4, 20) is proportional to point (8, 40) because both points can reduce to the same fraction when the points are in fractional form. For example, (8, 40) can also be 8/40. (4,20) can also be 4/20. When both reduce to their simplest form, the fractions both equal 1/5."* (1 point)

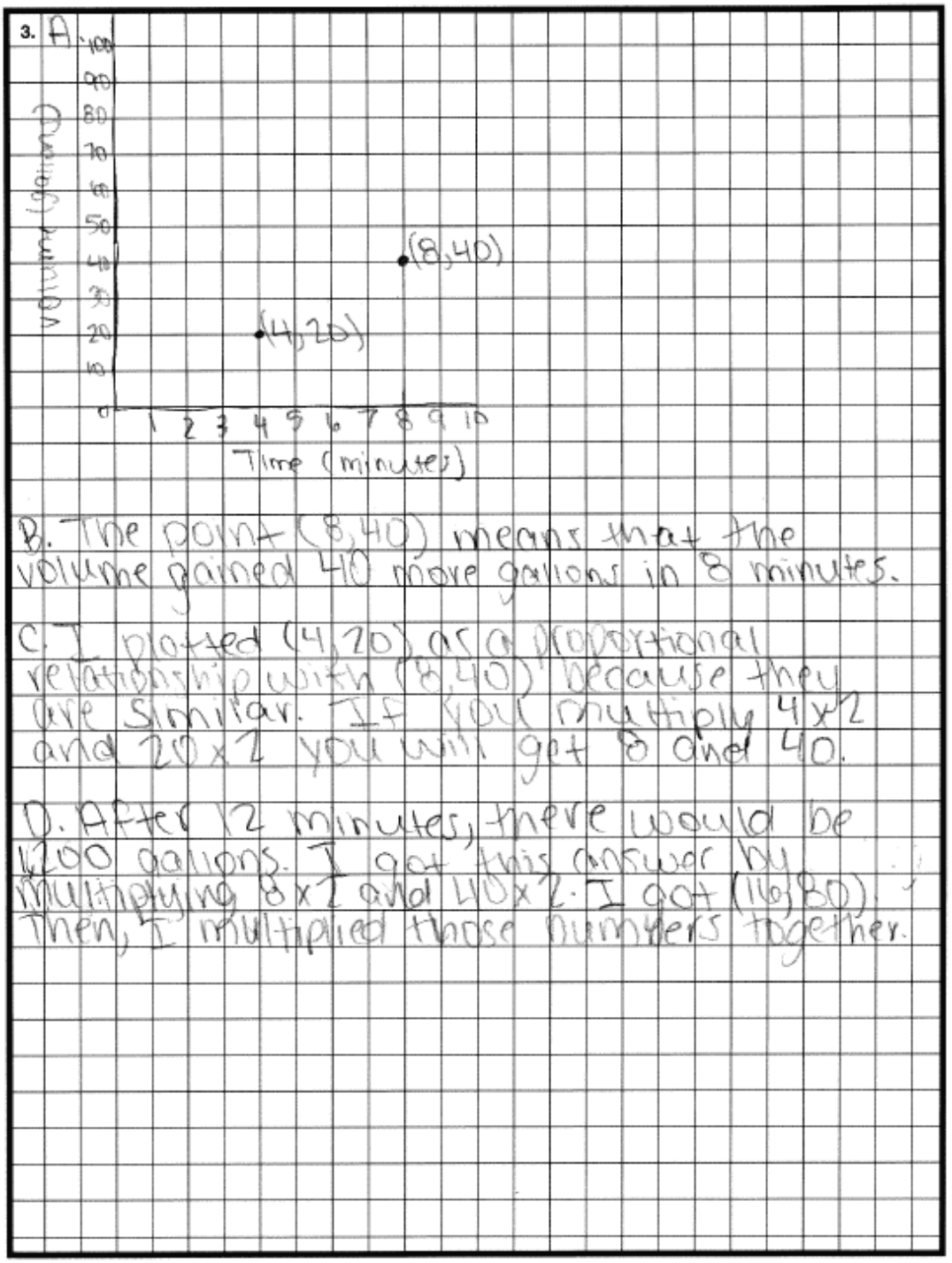
D The student correctly answers the question *"After 12 minutes…there will be 60 gallons of fuel in the truck."* The student explains *"Point (12, 60) is proportional to points (4, 20) and (8, 40)."* The student cross multiplies 8/40 and 12/60 to prove their proportionality. (1 point)

Overall, the student earns 4 points.

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 3-POINT RESPONSE **NOTES**



A 1.0

B 1.0

C 1.0

D 0

GRADE 7 — Mathematics

ANNOTATION - 3-POINT RESPONSE

A The student correctly sketches the graph with correct labeling and scaling of the x-axis and the y-axis. (1 point)

B The student plots and labels the point (8, 40) and correctly explains *"The point (8, 40) means that the volume gained 40 more gallons in 8 minutes."* (1 point)

C The student correctly plots and labels a second point *(4, 20)* using a proportional relationship with the point (8, 40). The student correctly explains the proportionality *"If you multiply 4 x 2 and 20 x 2 you will get 8 and 40."* (1 point)

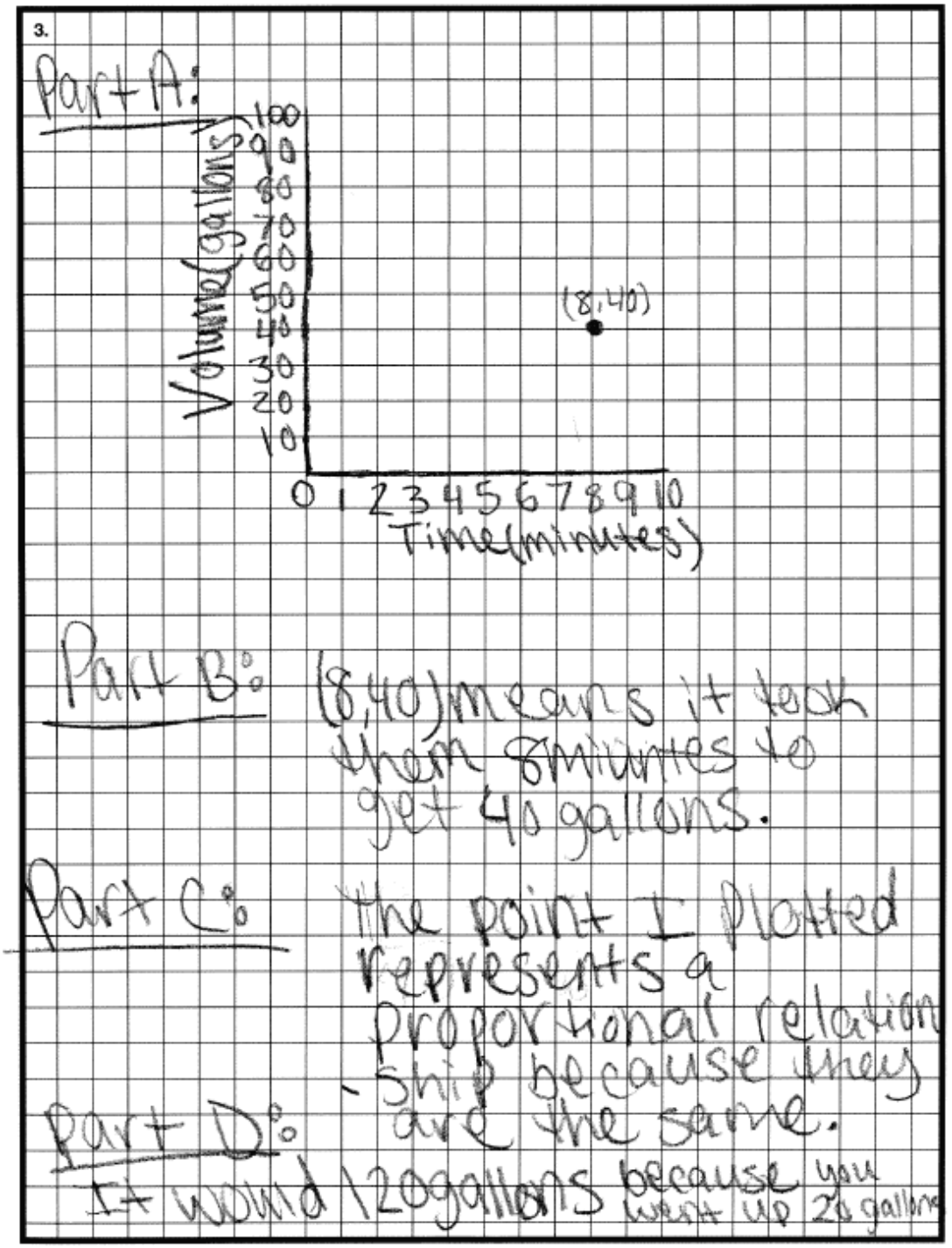
D The student's answer *"1,200 gallons"* and explanation are incorrect. (0 points)

Overall, the student earns 3 points.

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 2-POINT RESPONSE **NOTES**



A 1

B 1.0

C 0.0

D 0.0

GRADE 7 — Mathematics

ANNOTATION - 2-POINT RESPONSE

A The student correctly sketches the graph with correct labeling and scaling of the x-axis and the y-axis. (1 point)

B The student plots and labels the point (8, 40) and correctly explains *"(8, 40) means it took them 8 minutes to get 40 gallons."* (1 point)

C The student fails to plot or label a second point on the graph, explaining "*they are the same*." (0 points)

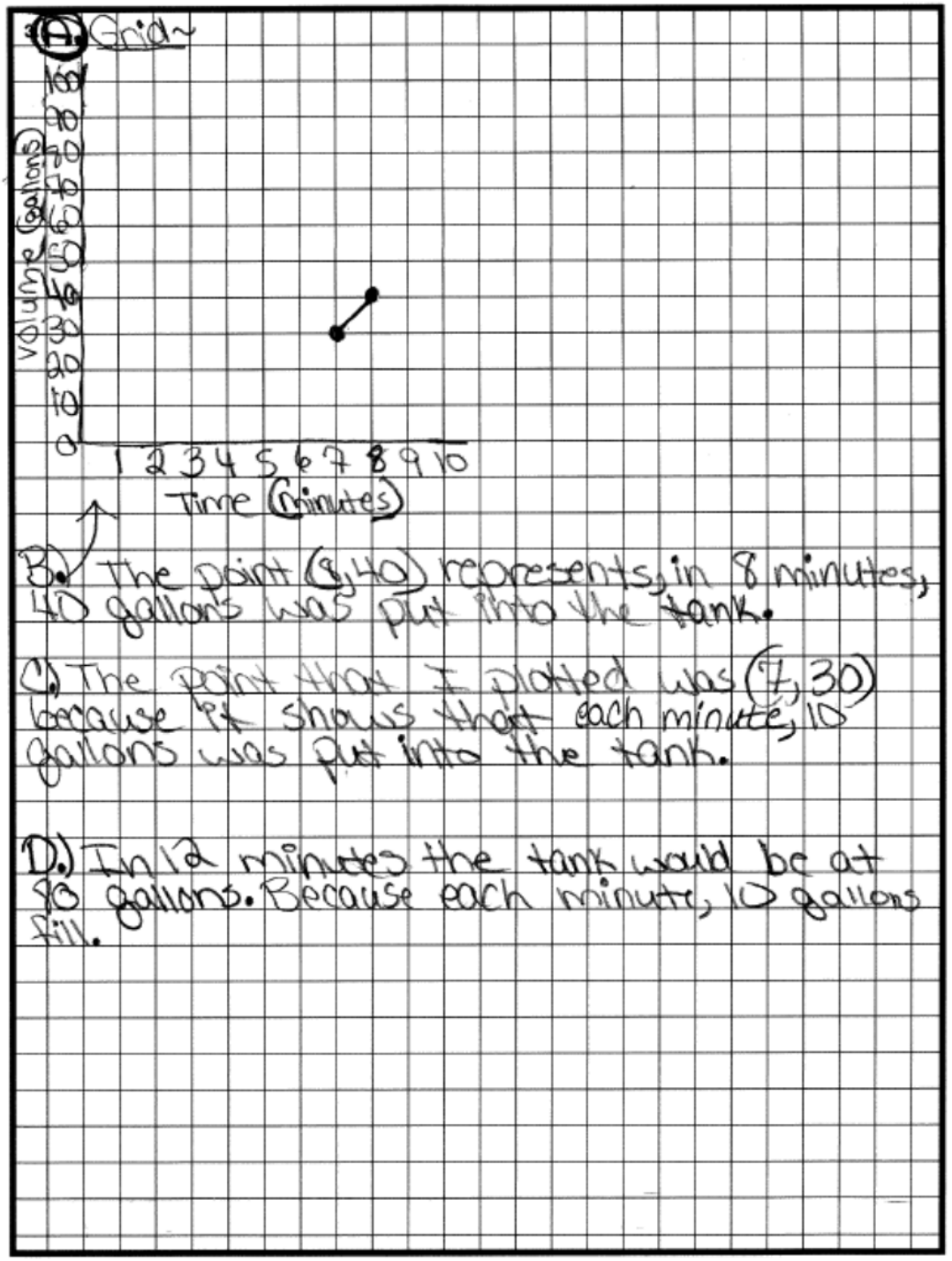
D The student provides an incorrect answer *"120 gallons"* and the explanation does not demonstrate any understanding of the task. (0 points)

Overall, the student earns 2.0 points.

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 1-POINT RESPONSE **NOTES**



A 1.

B 0.5

C 0.0

D 0.0

GRADE 7 — Mathematics

ANNOTATION - 1-POINT RESPONSE

A The student correctly sketches the graph with correct labeling and scaling of the x-axis and the y-axis. (1 point)

B The student plots the point (8, 40) and explains *"The point (8, 40) represents, in 8 minutes, 40 gallons was put into the tank."* However, the failure to label the point on the graph keeps this part of the response from getting one full point. (0.5 points)

C The student plots an incorrect point *(7, 30)* on the graph that is not proportional to the point (8, 40). The student's explanation is incorrect *"…it shows that each minute, 10 gallons was put into the tank."* The student also fails to label this point. (0 points)

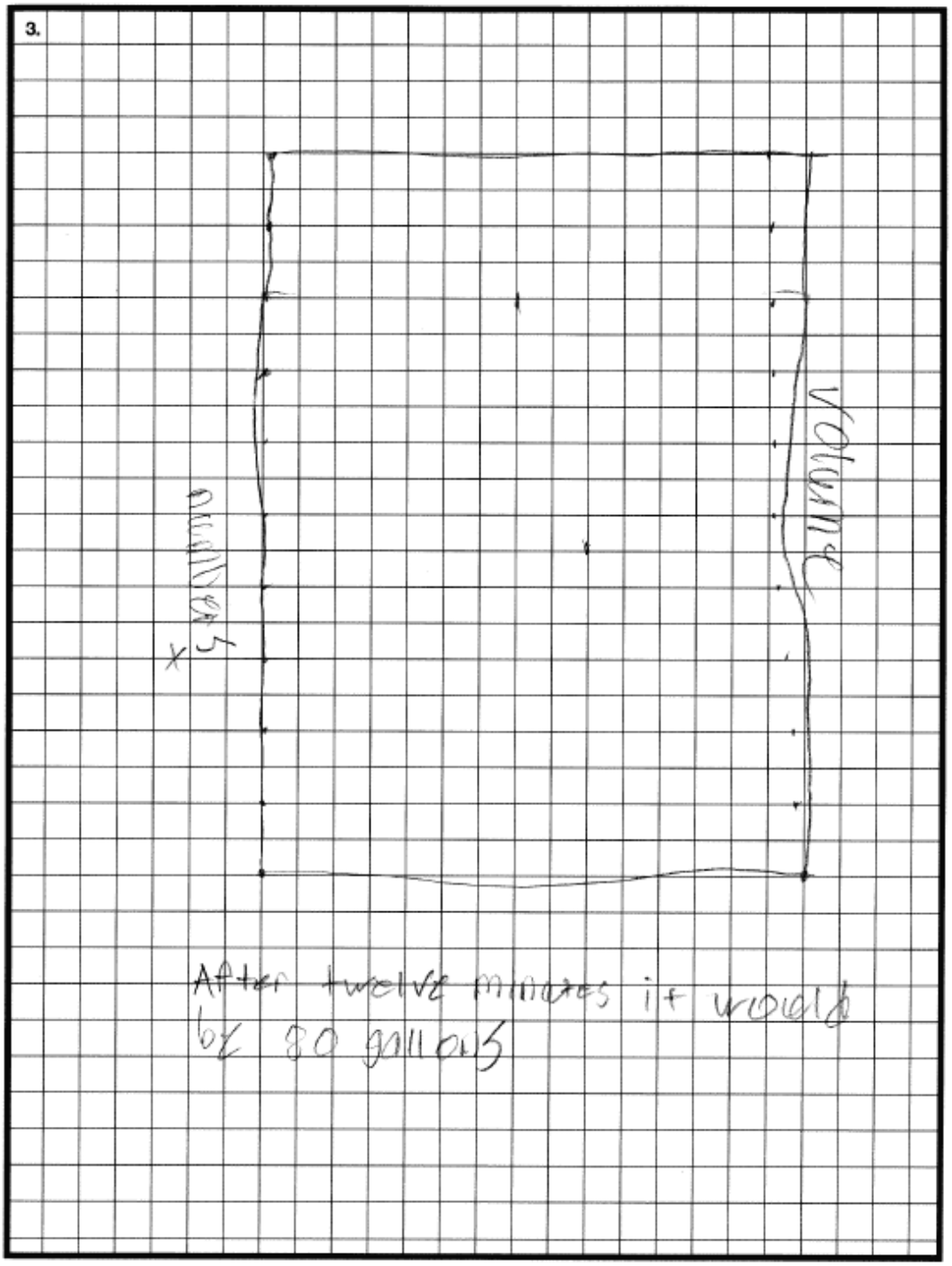
D The student provides an incorrect answer *"80 gallons"* with an incorrect explanation *"Because each minute, 10 gallons fill."* (0 points)

Overall, the student earns 1.5 points.

GRADE 7 — Mathematics

Annotated Student Response

SAMPLE 0-POINT RESPONSE **NOTES**



A 0.0

B 0.0

C 0.0

D 0.0

GRADE 7 — Mathematics

ANNOTATION - 0-POINT RESPONSE

A The student fails to draw a coordinate plane. (0 points)

B The student fails to plot and label the point (8, 40) or provide an explanation. (0 points)

C The student fails to plot and label a second point or provide an explanation. (0 points)

D The student provides an incorrect answer *"After twelve minutes it would be 80 gallons"* and no explanation. (0 points)

Overall, the student earns 0 points.

Item Information

Question Number	Key	DOK*	KCAS Primary Standard**
1	D	2	7.G.1
2	B	2	7.EE.1
3	C	2	7.NS.2.b
4	A	2	7.EE.4.b
5	B	2	7.G.5
6	NA	2	7.SP.3
7	NA	2	7.RP.3
8	NA	3	7.RP.2.d

*DOK is the abbreviation for Depth of Knowledge. Please note that DOK is associated to the complexity level of an assessment item and is not aligned to the standard. Further information regarding DOK can be accessed on the Kentucky Department of Education Web site: http://education.ky.gov/curriculum/docs/Pages/Content-Specific-Core-Content-for-Assessment-DOK-Support-Materials.aspx

**Further information regarding Common Core Standards can be accessed on the Common Core Web site: http://www.corestandards.org